

TITLE: Numerical Simulation of Mesoscale Precipitation

RESEARCH INVESTIGATOR:

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SIGNIFICANT ACCOMPLISHMENTS FY-83:

1. The NCAR graphics system has been implemented on the ASD Perkin-Elmer 3250 computer. User friendly subroutines have been written to allow easy access to mapping, contouring and vector plotting routines without prior knowledge of NCAR graphics.
2. Software for initializing the LAMPS mesoscale model has been written and implemented with options for real, real non-divergent or balanced initial winds. The objective analysis has been modified to use LFM or Global model data as first guess fields and to accept radiosonde or satellite data as processed and archived on MSFC/ ASD or University of Wisconsin formatted tapes.
3. The LAMPS model code has been implemented on the ASD Perkin-Elmer; several short test forecasts have been made for the March 6 1982 and April 25, 1975 cases.
4. A version of the LAMPS map processing graphics module was successfully run on both the Perkin-Elmer and IBM 4341. A simpler program was written which allows for a quick look at model output fields (also using NCAR graphics) and for transfer of gridded data from the Perkin-Elmer to the HP-1000.

CURRENT FOCUS OF RESEARCH:

1. Development of methods to incorporate VAS satellite derived specific humidity and precipitable water absolute values and/or gradient information into mesoscale model initial states.
2. Work is continuing on testing of the basic LAMPS model code, and specifically on inclusion of the convective parameterization.
3. A simplified version of the LAMPS "wind adjustment" program has been written and is being tested for inclusion with the MSFC model initialization package. Work has just begun to similarly modify another LAMPS routine to generate model time dependent lateral boundary tendencies.
4. Work is in progress to convert the LAMPS map processing code on the ASD Perkin-Elmer into an interactive program for more flexible viewing of mesoscale model output.
5. Work is underway to implement the LAMPS model code on the NASA/GSFC CYBER 205 computer for remote execution of large production model runs from MSFC.

FUTURE RESEARCH:

The remainder of FY-84 will be spent in support of items listed under current research. For FY-85 plans have been made for model forecast impact studies using satellite derived moisture. March 6, April 24 and April 26 cases have been chosen for study because of the availability of VAS measurements. Verification will emphasize mesoscale precipitation forecasts. These studies will provide evaluation for the quality of satellite moisture fields, model sensitivity to mesoscale moisture structure, and will provide guidelines for future space sensor requirements as regards the observation of atmospheric moisture.

PUBLICATIONS:

Results from a limited area mesoscale numerical forecast, Part I: Initialization with SESAME-AVE radiosonde data. (Submitted to Monthly Weather Review).

Results from a limited area mesoscale numerical forecast, Part II: Radiosonde versus satellite data initialization. (In preparation)

Initialization of a mesoscale model for April 10, 1979 using alternative data sources. (Submitted for publication as a NASA technical document).